Atlantic Richfield Company

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Anthony R. Brown
Project Manager, Mining

April 19, 2017

Lynda Deschambault
Remedial Project Manager, Superfund Division
U.S. Environmental Protection Agency, Region 9
75 Hawthorne Street, 10th Floor (SFD 7-1)
San Francisco, California 94105

Subject: **Supplemental 2017 Monitoring for Groundwater/Surface Water Interaction Investigation near Acidic Pond and Leviathan Creek**
Leviathan Mine Site
Alpine County, California

Dear Ms. Deschambault:

Atlantic Richfield Company (Atlantic Richfield) has prepared this letter to propose supplemental monitoring activities for the 2017 field season associated with the implementation of the On-Property Focused Remedial Investigation (FRI) Work Plan Amendment No. 11 - Task Sampling and Analysis Plan for Surface Water/Groundwater Interaction Investigation near Acidic Pond and Leviathan Creek[1] (Amendment No. 11) at Leviathan Mine Site (site) in Alpine County, California. Amendment No. 11 is being implemented in partial fulfillment of the requirements of the U.S. Environmental Protection Agency Region 9 (U.S. EPA) Statement of Work attached to the Administrative Order for Remedial Investigation and Feasibility Study (Unilateral Administrative Order), Comprehensive Environmental Response, Compensation, and Liability Act Docket No. 2008-18 issued on June 23, 2008.

The final Amendment No. 11 TSAP was submitted on May 6, 2016 and approved by U.S. EPA on June 14, 2016. Atlantic Richfield completed the scope of work outlined in the Amendment No. 11 TSAP during the 2016 field season. A total of 36 drive-point piezometers (DPZs) were installed along Leviathan Creek, with a higher density of DPZs installed at the acidic pond and at the marsh area near the confluence of Leviathan and Aspen creeks. All locations are shown on Figure 1. A generalized DPZ construction diagram is provided in Figure 2, and DPZ construction details are described on Table 1. The fully validated laboratory results for groundwater samples collected from the DPZs are not yet available; consequently, we have not yet completed our evaluation of groundwater/surface water interactions related to the Amendment No. 11 investigation. In addition, Atlantic Richfield anticipates that hydrologic conditions along lower Leviathan Creek during the 2017 field season may be different than those observed during the 2016 field season for the following reasons:

- The amount of precipitation recorded to date in the winter months of 2016-17 indicates that spring runoff will be above average. Hydrologic and hydraulic data

[1] Atlantic Richfield, 2016, On-Property Focused Remedial Investigation Work Plan Amendment No. 11 – Task Sampling and Analysis Plan for Surface Water/Groundwater Interaction Investigation Near Acidic Pond and Leviathan Creek, Leviathan Mine Site, Alpine County, California. Prepared by Amec Foster Wheeler Environment & Infrastructure, Inc., May 6.

collected during a very wet year may reveal different patterns (e.g. temporal reversals in gradient direction), than those collected during 2016, which was a year of average precipitation.

- Atlantic Richfield has proposed partially or completely removing Beaver Dams 3, 4, and 5 during the 2017 field season as described in the Draft Focused Feasibility Study Work Plan Evaluation of Remedial Technologies for Leviathan Creek Beaver Dam/Pond Complex[2] (BD/PC FFS Work Plan). The resulting lower surface water elevations will likely affect groundwater/surface water interactions at the drained ponds.

ADDITIONAL MONITORING PROPOSED FOR 2017

In light of these considerations, additional monitoring activities are proposed during the 2017 field season to serve the following objectives:

- Provide additional data to aid in our understanding of groundwater/surface water interactions in lower Leviathan Creek under above normal precipitation and runoff conditions;
- Evaluate changes in groundwater conditions and associated groundwater/surface water interactions in the vicinity of Beaver Ponds 3, 4, and 5 during and after the implementation of the BD/PC FFS Work Plan; and
- Provide additional data under post spring runoff conditions to aid in our evaluation of groundwater/surface water interactions in lower Leviathan Creek, including the marsh area near the confluence of Leviathan and Aspen creeks and in the vicinity of Delta Seep.

Based on the rationale summarized above, Atlantic Richfield recommends the following Amendment No. 11 scope of work for the 2017 field season, which is also summarized in Table 2, Table 3, and Figure 1. In addition, surface water sampling and streamflow measurements will be collected as part of the surface water program as described in a separate letter (dated April 7, 2017[3]) proposing the 2017 surface water program.

- Continued monitoring of water levels using the pressure transducers installed at select locations in 2016 (Tables 2 and 3);
- Manual measurements of groundwater levels approximately monthly at all DPZs (Table 2);
- Manual measurements of surface water levels approximately monthly adjacent to all DPZs (Table 2), using the DPZ top of casing as the reference point;

[2] Atlantic Richfield, 2017, Draft Focused Feasibility Study Work Plan Evaluation of Remedial Technologies for Leviathan Creek Beaver Dam/Pond Complex, Leviathan Mine Site, Alpine County, California. Prepared by Amec Foster Wheeler Environment & Infrastructure, Inc., March 21.

[3] Atlantic Richfield, 2017, Implementation of 2017 Surface Water Monitoring Program, Leviathan Mine Site, Alpine County, California, April 7.

- Manual measurements of streamflow in the vicinity of the marsh area (SW-15, SW-24, SW-66 and SW-67) approximately monthly (Table 3); and
- Select drive point piezometers will be sampled prior to and after dam removal activities in the beaver ponds. Sampling locations were selected based on proximity to Beaver Ponds 3, 4, and 5 and include DPZ-09, DPZ-10, DPZ-13, DPZ-14, DPZ-23, DPZ-24, DPZ-25, DPZ-26, DPZ-35, DPZ-36, SW-14, SW-68, and SD-25 (Tables 2 and 3). Samples will be analyzed for the same field parameters and laboratory analytes as the previously approved Amendment No. 11 TSAP.
- Exact locations scheduled for laboratory or field parameter analyses are subject to change based on actual field conditions encountered during the implementation of the BD/PC FFS Work Plan.

REPORTING

Data collected during the implementation of the previously approved Amendment No. 11 TSAP during the 2016 season will be evaluated and incorporated into the Site Characterization Report planned for submittal by the end of 2017. Data collected during the 2017 field season will be presented in a subsequent appendix or supplement to the Site Characterization and/or the Draft RI Report.

ACCESS CONSIDERATIONS

Surface water flows during the spring are anticipated to be the highest observed since Amendment No. 11 monitoring has been implemented. As a result, Atlantic Richfield will attempt to implement the proposed activities at the identified locations, but certain locations may be inaccessible due to high flow conditions. If conditions are encountered where a location cannot be safely accessed, the conditions preventing access will be documented.

CLOSING

Atlantic Richfield respectfully requests expedited approval of the proposed field activities. Based on current long range forecast, field activities would begin in approximately May 2017.

If you have any questions or comments, please feel free to contact me at (657) 529-4537 or anthony.brown@bp.com.

Sincerely,

Anthony R. Brown
Project Manager, Mining

Attachment: Table 1 – Drive Point Piezometer Preliminary Construction Details
Table 2 – Summary of Proposed 2017 Drive-Point Piezometer Monitoring
Table 3 – Summary of Proposed 2017 Amendment 11 Surface Water Monitoring

Figure 1 – Amendment No. 11 Investigation Locations
Figure 2 – Generalized Drive-Point Piezometer Construction Diagram

cc: Gary Riley, U.S. Environmental Protection Agency, Region 9 – via electronic copy
John Hillenbrand, U.S. Environmental Protection Agency, Region 9 – via electronic copy
Douglas Carey, Lahontan Regional Water Quality Control Board – via electronic copy
Nathan Block, Esq., BP – via electronic copy
Adam Cohen, Esq., Davis Graham & Stubbs, LLP – via electronic copy
Sandy Riese, EnSci, Inc. – via electronic copy
Marc Lombardi, Amec Foster Wheeler – via electronic copy
Grant Ohland, Ohland HydroGeo, LLC – via electronic copy
Dave McCarthy, Copper Environmental Consulting – via electronic copy
Cory Koger, U.S. Army Corps of Engineers – via electronic copy
Greg Reller, Burleson Consulting – via electronic copy
Ken Maas, U.S. Forest Service, Humboldt-Toiyabe National Forest – via electronic and hard copy
Michelle Hochrein, Washoe Tribe of California and Nevada – via electronic and hard copy
Fred Kirschner, AESE, Inc. – via electronic and hard copy

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TABLES

TABLE 1
DRIVE-POINT PIEZOMETER PRELIMINARY CONSTRUCTION DETAILS
Leviathan Mine Site
Alpine County, California

Location ID [1]	Installation Date	Northing[2,3] (ft)	Easting[2,3] (ft)	Top of Casing Elevation[3,4] (fmsl)	Casing Bottom Depth[3] (ft BTOC)	Casing Top Depth[3] (ft ags)	Total Depth[3] (ft BTOC)	Depth to Top of Screen[3] (ft BTOC)	Depth to Bottom of Screen[3] (ft BTOC)
DPZ-07	4/21/2016	2030995.79	7228926.85	6659.45	9.65	2.75	6.9	9.25	9.55
DPZ-08	4/21/2016	2030996.05	7228927.60	6659.75	12.65	3.25	9.4	12.25	12.55
DPZ-09	4/20/2016	2030981.10	7229038.99	6660.35	9.65	3.83	5.82	9.25	9.55
DPZ-10	4/20/2016	2030980.59	7229038.47	6660.50	12.65	4.08	8.57	12.25	12.55
DPZ-11	4/20/2016	2031033.68	7228987.18	6659.64	6.65	3.00	3.65	6.25	6.55
DPZ-12	4/20/2016	2031033.34	7228986.67	6659.91	12.65	3.31	9.34	12.25	12.55
DPZ-13	4/20/2016	2031043.97	7228919.97	6659.58	9.65	3.56	6.09	9.25	9.55
DPZ-14	4/20/2016	2031044.36	7228920.67	6659.66	12.65	3.92	8.73	12.25	12.55
DPZ-15	4/20/2016	2031058.46	7229093.30	6677.43	30.65	2.25	28.40	30.25	30.55
DPZ-16	4/20/2016	2030974.94	7228853.36	6662.71	12.65	4.08	8.57	12.25	12.55
DPZ-17	4/19/2016	2031602.76	7229425.90	6621.99	3.65	1.00	2.65	3.25	3.55
DPZ-18	4/19/2016	2031602.42	7229425.60	6623.59	9.65	2.67	6.98	9.25	9.55
DPZ-19	4/19/2016	2031908.35	7229361.76	6604.23	3.65	1.10	2.55	3.25	3.55
DPZ-20	4/19/2016	2031908.24	7229362.08	6605.65	9.65	2.50	7.15	9.25	9.55
DPZ-21	4/19/2016	2031590.11	7229239.95	6614.86	3.65	1.00	2.65	3.25	3.55
DPZ-22	4/19/2016	2031590.42	7229239.60	6616.05	9.65	2.33	7.32	9.25	9.55
DPZ-23	4/20/2016	2031198.59	7228967.88	6656.50	9.65	2.33	7.32	9.25	9.55
DPZ-24	4/20/2016	2031199.25	7228968.09	6656.68	15.65	2.58	13.07	15.25	15.55
DPZ-25	4/21/2016	2030905.86	7228891.74	6662.64	6.65	3.79	2.86	6.25	6.55
DPZ-26	4/21/2016	2030906.45	7228892.43	6663.06	9.65	3.83	5.82	9.25	9.55
DPZ-27	4/21/2016	2030479.93	7229026.60	6679.83	6.65	3.71	2.94	6.25	6.55
DPZ-28	4/21/2016	2030480.47	7229026.54	6680.36	9.65	4.40	5.25	9.25	9.55
DPZ-29	4/21/2016	2030021.61	7228977.07	6699.19	6.65	3.58	3.07	6.25	6.55
DPZ-30	4/21/2016	2030021.58	7228977.68	6699.78	9.65	4.33	5.32	9.25	9.55
DPZ-31	4/19/2016	2029491.80	7228560.10	6738.20	6.65	3.42	3.23	6.25	6.55
DPZ-32	4/19/2016	2029492.34	7228562.28	6737.57	9.65	3.42	6.23	9.25	9.55
DPZ-34	4/21/2016	2028492.98	7228529.24	6802.42	9.65	2.50	7.15	9.25	9.55
DPZ-35	4/19/2016	2031203.97	7228927.52	6659.04	6.65	4.00	2.65	6.25	6.55
DPZ-36	4/19/2016	2031204.62	7228927.95	6659.09	9.65	4.00	5.65	9.25	9.55
DPZ-37	4/19/2016	2030468.20	7228998.47	6681.09	6.65	4.42	2.23	6.25	6.55
DPZ-38	4/19/2016	2030468.46	7228998.10	6681.28	12.65	5.17	7.48	12.25	12.55
DPZ-39	4/19/2016	2029498.79	7228560.90	6737.26	6.65	2.75	3.90	6.25	6.55
DPZ-40	4/19/2016	2029503.68	7228558.77	6737.77	9.65	3.42	6.233	9.25	9.55
DPZ-42	4/21/2016	2028485.62	7228503.11	6802.96	9.65	1.83	7.82	9.25	9.55
DPZ-43	4/21/2016	2028275.45	7228565.86	6818.33	9.65	2.33	7.32	9.25	9.55
DPZ-44	4/21/2016	2028274.66	7228565.98	6818.39	12.65	2.25	10.40	12.25	12.55

Notes

1. Locations shown on Figure 1.
2. Horizontal coordinates were surveyed by Summit Engineering and reference NAD83, California Zone 2.
3. All data are preliminary.
4. Elevations were surveyed by Summit Engineering and reference NGVD29.

Abbreviations

ags = above ground surface
BTOC = below top of casing
ft = feet
fmsl = feet above mean sea level
ID = identification
NAD83 = North American Datum of 1983
NGVD29 = National Geodetic Vertical Datum of 1929

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TABLE 2
SUMMARY OF PROPOSED 2017 DRIVE-POINT PIEZOMETER MONITORING
Leviathan Mine Site
Alpine County, California

Parameters			Dissolved Metals[2]		Dissolved Mercury	Anions[4]	oPO4	Alkalinity[5]	Acidity	TDS	Cations[3]	Hardness ($CaCO_3$)	Field Parameters[1]	Hexavalent chromium	Ferrous Iron	NH_3 (as N)	QC Samples[6]			Manual measurements of groundwater and surface water levels	Continuous water-level measurements using pressure transducer/data logger
																	Field Blanks	Field Duplicates	MS/MSD or LD[8]		
Method			EPA 200.8	EPA 200.7	EPA 245.1	EPA 300.0	EPA 300.0/ EPA 365.3	SM 2320B	SM 2310B	SM 2540C	EPA 200.7	SM 2340B	SOP 6.0	EPA 218.6[7]	SOP 6.0	SM 4500 NH3					
Containers			1 x 250 mL HDPE			1 x 1 L HDPE					1 x 250 mL HDPE		1 x 100 mL HDPE	1 X 250 mL HDPE	1 x 250 mL HDPE	1 x 500 mL HDPE	Same as Primary Sample		Same as Primary Sample		
Minimum Volume (mL)			50	50	150	30	50	125	125	125	50		25	50	25	500					
Field Filtered[9]			Yes			No					No		No	Yes	Yes	No					
Preservation[10]			HNO_3			None					HNO_3		None	None / $(NH_4)_2SO_4$	None	H_2SO_4					
Maximum Holding Time[11]			28d			48hr	48hr	14d	14d	7d	28d	28d	ASAP	24hr / 28d	ASAP	28d					
Laboratory			ALS										NA	TestAmerica	NA	ALS					
Study Area	**Feature**	**Sampling Locations[12]**																			
LCSA	Acidic Pond	DPZ-07																		X	X
LCSA		DPZ-08																		X	X
LCSA		DPZ-09	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X		X	
LCSA		DPZ-10	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			X	
LCSA		DPZ-11																		X	X
LCSA		DPZ-12																		X	
LCSA		DPZ-13	X	X	X	X	X	X	X	X	X	X	X	X	X	X				X	
LCSA		DPZ-14	X	X	X	X	X	X	X	X	X	X	X	X	X	X			X	X	
LCSA		DPZ-15																		X	X
LCSA		DPZ-16																		X	
LCSA	Confluence of Leviathan and Aspen Creeks	DPZ-17																		X	
LCSA		DPZ-18																		X	
ACSA		DPZ-19																		X	
ACSA		DPZ-20																		X	X
LCSA		DPZ-21																		X	
LCSA		DPZ-22																		X	
LCSA	Leviathan Creek from Delta Seep downstream to the confluence of Leviathan and Aspen Creeks	DPZ-23	X	X	X	X	X	X	X	X	X	X	X	X	X	X				X	
LCSA		DPZ-24	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X		X	
LCSA		DPZ-25	X	X	X	X	X	X	X	X	X	X	X	X	X	X				X	X
LCSA		DPZ-26	X	X	X	X	X	X	X	X	X	X	X	X	X	X				X	X
LCSA		DPZ-27																		X	X
LCSA		DPZ-28																		X	X
LCSA		DPZ-29																		X	
LCSA		DPZ-30																		X	
LCSA		DPZ-31																		X	
LCSA		DPZ-32																		X	
LCSA		DPZ-34																		X	
LCSA		DPZ-35	X	X	X	X	X	X	X	X	X	X	X	X	X	X				X	
LCSA		DPZ-36	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			X	
LCSA		DPZ-37																		X	
LCSA		DPZ-38																		X	
LCSA		DPZ-39																		X	
LCSA		DPZ-40																		X	
LCSA		DPZ-42																		X	
LCSA		DPZ-43																		X	
LCSA		DPZ-44																		X	
Total Samples per Event			**10**	**10**	**10**	**10**	**10**	**10**	**10**	**10**	**10**	**10**	**10**	**10**	**10**	**10**	**2**	**2**	**1**	**36**	**9**

Notes
1. Field parameters include temperature, specific electrical conductance, pH, dissolved oxygen, and oxidation-reduction potential.
2. Metals include: aluminum, antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, iron, lead, manganese, nickel, silver, selenium, thallium, vanadium, and zinc.
3. Cations include: calcium, potassium, sodium, and magnesium.
4. Anions include: chloride, sulfate, and nitrate-N.
5. Alklanity includes: total, bicarbonate, carbonate and hydoxide components.
6. QC sample locations are dependent on actual samples collected and may need to be adjusted to meet the required 10% minimum (every 10 samples) for field blanks and field duplicates and the 5% minimum (every 20 samples) for MS/MSD or LD.
7. Samples for hexavalent chromium may be preserved with $(NH_4)_2SO_4$ when sample pH> 6 (minimize buffering) to extend the maximum holding time from 24 hours to 28 days.
8. LD analyzed in lieu of MS/MSD where "spiking" is not amenable to the test method.
9. Filter samples using a 0.45 micron high capacity filter.
10. Samples should be stored at a temperature ranging from 0°C - 6°C.
11. Represents the shortest recommended holding time where multiple target analytes are listed.
12. Approximate sampling locations shown on Figure 1. Locations scheduled for laboratory or field parameter analyses are subject to change based on actual field activities conducted under the March 21, 2017 BD/PC FFS Work Plan.

Sample ID

Groundwater samples: GWLMMDDYYXX Use for all samples collected in the Leviathan Creek Study Area, consecutively, for a given date.
GWAMMDDYYXX Use for all samples collected in the Aspen Creek Study Area, consecutively, for a given date.

Abbreviations

°C = degrees Celsius
ACSA = Aspen Creek Study Area
ALS = ALS Environmental
ASAP = as soon as possible
$CaCO_3$ = calcium carbonate
d = days
DOC = dissolved organic carbon
EPA = Environmental Protection Agency
H_2SO_4 = sulfuric acid
HCl = hydrochloric acid
HDPE = high density polyethylene
HNO_3 = nitric acid
hr = hours
ID = identification
L = liter
LCSA = Leviathan Creek Study Area
LD = laboratory duplicate
mL = milliliter
MS/MSD = matrix spike / matrix spike duplicate
N = nitrogen
$(NH_4)_2SO_4$ = ammonium sulfate
NH_3 = ammonia
oPO4 = ortho-phosphate-P
QC = quality control
SM = Standard Methods for Water and Wastewater
SOP = standard operating procedure
su = standard units
TDS = total dissolved solids

TABLE 3
SUMMARY OF PROPOSED 2017 AMENDMENT 11 SURFACE WATER MONITORING
Leviathan Mine Site
Alpine County, California

Parameters			Field Parameters[1]	Ferrous Iron	Hexavalent chromium	Dissolved Metals[2]	Total Metals[2]	Cations[3]	Hardness ($CaCO_3$)	DOC	NH_3 (as N)	Anions[4]	Alkalinity[5]	Acidity	TDS	QC Samples[6]			Monthly surface water flow measurements	Continuous water level monitoring using pressure transducer/data logger
Method			SOP 6.0		EPA 218.6[7]	EPA 200.7/ EPA 200.8/ EPA 245.1	EPA 200.7/ EPA 200.8/ EPA 245.1	EPA 200.7	SM 2340B	SM 5310B	SM 4500 NH3	EPA 300.0/ EPA 365.3	SM 2320B	SM 2310B	SM 2540C	Field Blanks	Field Duplicates	MS/MSD or LD[8]		
Containers			1 x 100 mL HDPE	1 x 250 mL HDPE	1 X 250 mL HDPE	1 x 250 mL HDPE	1 x 250 mL HDPE			1x250 mL glass	1 x 500 mL HDPE	1 x 1 L HDPE				Same as Primary Sample	Same as Primary Sample			
Minimum Volume			25 mL	25 mL	250 mL	250 mL	250 mL			125 mL	500 mL	1 L								
Field Filtered[9]			No	Yes	Yes	Yes	No			Yes	No	No								
Preservation[10]			None		None	HNO_3	HNO_3			H_2SO_4 or HCl	H_2SO_4	None								
					$(NH_4)_2SO_4$															
Maximum Holding Time[11]			ASAP		24 hr	28 d	28 d			28 d	28 d	48 hr	14 d	7 d						
					28 d															
Laboratory			NA		TestAmerica	ALS														
Study Area	**Feature**	**Sampling Locations[12]**																		
LCSA	Acidic Pond	SW-68	X	X	X	X	X	X	X	X	X	X	X	X	X		X			X
LCSA	Leviathan Creek from Delta Seep to downstream of the confluence of Leviathan and Aspen Creeks	SD-25	X	X	X	X	X	X	X	X	X	X	X	X	X	X				X
LCSA		SD-31																		X
LCSA		SW-14	X	X	X	X	X	X	X	X	X	X	X	X	X			X		
LCSA		SW-15																	X	
LCSA		SW-66																	X	
DSA		SW-67																	X	
ACSA	Aspen Creek	SW-24																	X	
Total Samples per Event			**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**1**	**1**	**1**	**4**	**3**

Notes
1. Field parameters include temperature, specific electrical conductance, pH, dissolved oxygen, and oxidation-reduction potential.
2. Metals include: aluminum, antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, iron, lead, manganese, mercury, nickel, silver, selenium, thallium, vanadium, and zinc.
3. Cations include: calcium, potassium, sodium, and magnesium.
4. Anions include: chloride, sulfate, nitrate-N, and ortho-phosphate-P.
5. Alklanity includes: total, bicarbonate, carbonate and hydoxide components.
6. QC sample locations are dependent on actual samples collected and may need to be adjusted to meet the required 10% minimum (every 10 samples) for field blanks and field duplicates and the 5% minimum (every 20 samples) for MS/MSD or LD.
7. Samples for hexavalent chromium may be preserved with $(NH_4)_2SO_4$ when sample pH> 6 (minimize buffering) to extend the maximum holding time from 24 hours to 28 days.
8. LD analyzed in lieu of MS/MSD where "spiking" is not amenable to the test method.
9. Filter samples using a 0.45 micron high capacity filter.
10. Samples should be stored at a temperature ranging from 0°C - 6°C.
11. Represents the shortest recommended holding time where multiple target analytes are listed.
12. Approximate sampling locations shown on Figure 1. Locations scheduled for laboratory or field parameter analyses are subject to change based on actual field activities conducted under the March 21, 2017 BD/PC FFS Work Plan.

Sample ID

Surface water samples: SWLMMDDYYXX Use for all samples collected in the Leviathan Creek Study Area, consecutively, for a given date.
SWAMMDDYYXX Use for all samples collected in the Aspen Creek Study Area, consecutively, for a given date.

Abbreviations

°C = degrees Celsius
ACSA = Aspen Creek Study Area
ALS = ALS Environmental
ASAP = as soon as possible
$CaCO_3$ = calcium carbonate
d = days
DOC = dissolved organic carbon
EPA = Environmental Protection Agency
H_2SO_4 = sulfuric acid
HCl = hydrochloric acid
HDPE = high density polyethylene
HNO_3 = nitric acid
hr = hours
ID = identification
L = liter
LCSA = Leviathan Creek Study Area
LD = laboratory duplicate
mL = milliliter
MS/MSD = matrix spike / matrix spike duplicate
N = nitrogen
$(NH_4)_2SO_4$ = ammonium sulfate
NH_3 = ammonia
QC = quality control
SM = Standard Methods for Water and Wastewater
SOP = standard operating procedure
su = standard units
TDS = total dissolved solids

FIGURES

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SW-67
SD-29
DPZ-19 (2')
DPZ-20 (5')
APPROXIMATE LOCATION OF CULVERT UNDER LEVIATHAN MINE ROAD
SW-49
SW-15
DPZ-21 (2')
DPZ-22 (5')
DPZ-17 (2')
DPZ-18 (5')
SW-66
SW-24
Aspen Creek
INSET A
Transect 0
SW-14
SD-10
SD-25
Transect 1
MW-44
MW-42
MW-43
Transect 2
DPZ-27 (2')
DPZ-28 (5')
SD-31
Transect 3
SD-07
DPZ-37 (2')
DPZ-38 (5')
Transect 4
MW-41
SW-13
Transect 5
DPZ-39 (2')
DPZ-40 (5')
SW-65
DPZ-31 (2')
DPZ-32 (5')
Leviathan Creek
SW-11
DPZ-34 (5')
DPZ-42 (5')
SW-10
DPZ-43 (2')
DPZ-44 (5')
DELTA SEEP
SW-09

INSET A
SW-14
DPZ-35 (2')
DPZ-36 (5')
Transect 0
DPZ-23 (2')
DPZ-24 (5')
APPROXIMATE LOCATION OF HAUL ROAD CULVERT
DPZ-13 (2')
DPZ-14 (5')
SW-69
DPZ-15
DPZ-07 (2')
DPZ-08 (5')
DPZ-11 (2')
DPZ-12 (5')
SW-68
DPZ-16
SD-25
SW-68
DPZ-09 (2')
DPZ-10 (5')
Transect 1
DPZ-25 (2')
DPZ-26 (5')
APPROXIMATE EXTENT OF ACIDIC POND IN ABSENCE OF BEAVER POND FLOODING

Explanation
- Beaver Dam Locations
- Leviathan Creek Basin Landslide
- Transects for Amendment 10
- Proposed Surface Water Station
- Surface Water Monitoring Stations
- Proposed Drive-Point Piezometers
- Proposed Seepage Meter
- Existing Monitoring Well Locations
- Proposed Surface Water Gauge
- Acidic Pond

Soil Type
- coarse-loamy
- coarse-loamy, shallow water table
- fine
- fine, shallow water table
- fine-loamy

Floodplain Age Category
- 1
- 2
- 3

N

0 500 Feet

AMENDMENT NO. 11
INVESTIGATION LOCATIONS
Leviathan Mine Site
Alpine County, California

amec foster wheeler

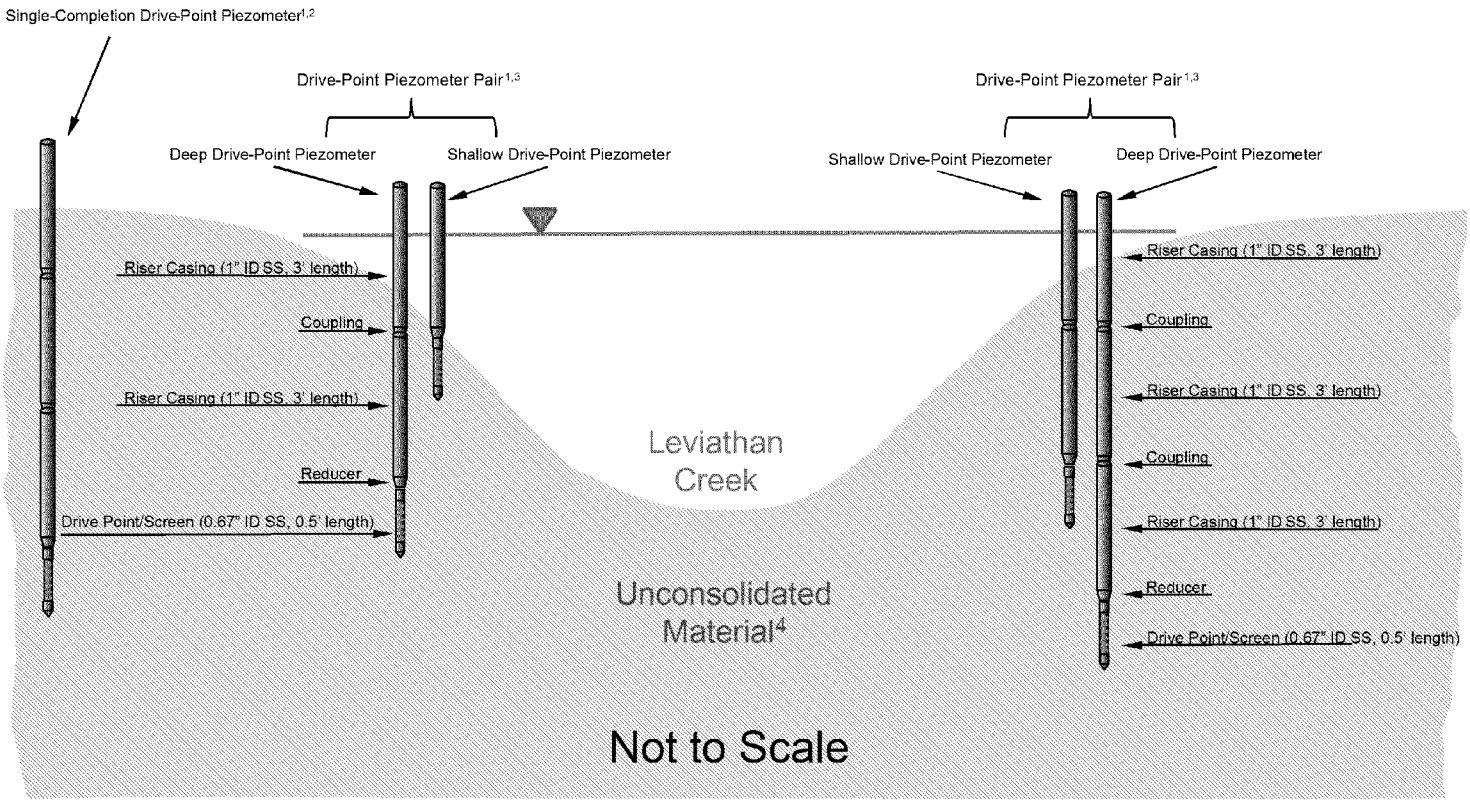
By: DMC
Date: 03/29/2017

Project No. 0013091

Figure 1

ED_001709_00000287-00010

P:\Project\13000s\13091 Leviathan\4000 Regulatory\4140 RI Work Plans\4 FRIs\7 On-Property\Amendment 11_SW_GW Interaction LevCrk\170419 2017 Proposed Work\Figure 2 DPZ Construction.pptx



Notes:
1) Locations of drive-point piezometers are provided on Figure 1. Spatial coordinates and construction details are provided on Table 1.
2) Four single-completion drive-point piezometers were installed.
3) Sixteen nested (one deep and one shallow) drive -point piezometer pairs were installed. When possible, drive-point piezometer pairs were installed directly in surface water.
4) Logging of materials is not possible during drive -point piezometer installation because no soil cuttings are generated.

GENERALIZED DRIVE-POINT PIEZOMETER CONSTRUCTION DIAGRAM
Leviathan Mine Site
Alpine County, California

Date: 04/17/2017
By: ALB

Project No. 0013091

amec foster wheeler

Figure 2

ED_001709_00000287-00011